

Thanksgiving Bingo Review Key

$$1) \quad \frac{3^{3m+1} - 5}{+5} = \frac{22}{+5}$$

$$3^{3m+1} = 27$$

$$3^{3m+1} = 3^3$$

$$\frac{3m+1}{-1 \quad -1} = \frac{3}{-1 \quad -1}$$

$$3m = 2$$

$$m = \frac{2}{3}$$

$$2) \quad \frac{x^2 - 4x - 32}{x^2 + 12x + 32} \cdot \frac{x^2 - 64}{(x-8)^2}$$

$$\frac{(x-8)(x+4)}{(x+8)(x+4)} \cdot \frac{(x-8)(x+8)}{(x-8)(x-8)} = \boxed{1}$$

$$3) \quad \frac{(y-6) \cdot 1}{(y-6)(y+6)} + \frac{2(y+6)}{y-6(y+6)} + \frac{12}{(y-6)(y+6)} = \frac{y-6}{(y-6)(y+6)} + \frac{2(y+6)}{(y-6)(y+6)} + \frac{12}{(y-6)(y+6)} = \frac{y-6+2y+12+12}{(y-6)(y+6)}$$

$$= \frac{3y+18}{(y+6)(y-6)} = \frac{3(y+6)}{(y+6)(y-6)} = \boxed{\frac{3}{y-6}}$$

$$4) \quad \frac{-k}{2-k} - \frac{8}{k^2-4} = \frac{-k}{2-k} - \frac{8}{(k+2)(k-2)} = \frac{k(k+2)}{k-2(k+2)} \cdot \frac{8}{(k+2)(k-2)} = \frac{k^2+2k-8}{(k+2)(k-2)}$$

$$= \frac{(k+4)(k-2)}{(k+2)(k-2)} = \boxed{\frac{k+4}{k+2}}$$

$$5) \quad \frac{(y^2) \cdot 1 - \frac{3(y^2)}{y} + \frac{2}{y^2} \cdot (y^2)}{(y^2) \cdot 1 - \frac{5(y^2)}{y} + \frac{6}{y^2} \cdot (y^2)} = \frac{y^2 - 3y + 2}{y^2 - 5y + 6} = \frac{(y-2)(y-1)}{(y-2)(y-3)} = \boxed{\frac{y-1}{y-3}}$$

$$6) \frac{y(y+7)(y-7)}{y+7} + \frac{42(y+7)(y-7)}{(y+7)(y-7)} = \frac{3(y+7)(y-7)}{y-7} = \frac{y^2 - 7y + 42}{-3y - 21} = \frac{3y + 21}{-3y - 21}$$

rest. $y \neq 7, -7$

$$y^2 - 10y + 21 = 0$$

$$(y-3)(y-7) = 0$$

$$\boxed{y=3} \quad y=7 \text{ reject}$$

$$7) \frac{x - \sqrt{x+4}}{-x} = \frac{2}{-x}$$

$$-\sqrt{x+4} = -x + 2$$

$$\frac{-\sqrt{x+4}}{-1} = \frac{-x+2}{-1}$$

$$(\sqrt{x+4})^2 = (x-2)^2$$

$$\frac{x+4}{-x-4} = \frac{x^2-4x+4}{-x-4}$$

$$0 = x^2 - 5x$$

$$0 = x(x-5)$$

$$x=0 \quad \boxed{x=5}$$

$$8) x^2 - 16x + 21 = 0$$

$$(-16)^2 - 4(1)(21)$$

$$256 - 84$$

172 Real, Irrational, unequal

$$9) x^2 - 16x + 64 = 0$$

$$(-16)^2 - 4(1)(64) =$$

$$256 - 256$$

$$0 \quad \text{Real, Rational, Equal}$$

$$10) x^2 - x + 7 = 0$$

$$(-1)^2 - 4(1)(7)$$

$$1 - 28$$

$$-27 \text{ Imaginary}$$

$$11) x^2 - x - 20 = 0$$

$$(-1)^2 - 4(1)(-20)$$

$$1 + 80$$

$$81 \text{ Real, Rational, unequal}$$

$$12) a^3 - 12a^2 + 20a$$

$$a(a^2 - 12a + 20)$$

$$a(a-10)(a-2)$$

$$13) x^2 = 6x - 1$$

$$x^2 - 6x + 1 = 0$$

$$\sqrt{32}$$

$$\sqrt{16} \sqrt{2}$$

$$4\sqrt{2}$$

$$x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(1)(1)}}{2(1)}$$

$$x = \frac{6 \pm \sqrt{32}}{2}$$

$$x = \frac{6 \pm 4\sqrt{2}}{2} = 3 \pm 2\sqrt{2}$$

$$\begin{aligned} a &= 2 \\ b &= -3 \\ c &= -7 \end{aligned}$$

$$14) 2x^2 - 7 = 3x$$

$$2x^2 - 3x - 7 = 0$$

$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(2)(-7)}}{2(2)}$$

$$x = \frac{3 \pm \sqrt{65}}{4}$$

$$x = \frac{3 + \sqrt{65}}{4} = 2.77$$

$$x = \frac{3 - \sqrt{65}}{4} = -1.27$$

$$\begin{aligned} \frac{8}{2} &= 4 \\ 4^2 &= 16 \end{aligned}$$

$$15) x^2 + 8x + 10 = 0$$

$$x^2 + 8x + \boxed{16} = -10 + \boxed{16}$$

$$(x+4)^2 = 6$$

$$x+4 = \pm\sqrt{6}$$

$$x = -4 \pm \sqrt{6}$$

$$16) 3x^2 - 5 = 2x \rightarrow \frac{3x^2}{3} - \frac{2x}{3} - \frac{5}{3} = 0$$

$$x^2 - \frac{2}{3}x + \boxed{\frac{4}{36}} = \frac{5}{3} + \boxed{\frac{4}{36}}$$

$$\left(x - \frac{2}{6}\right)^2 = \sqrt{\frac{16}{9}}$$

$$\left(x - \frac{2}{6}\right) = \pm \frac{4}{3}$$

$$+ \frac{2}{6} \quad + \frac{2}{6}$$

$$\frac{2}{6} + \frac{4}{3} = \frac{5}{3}$$

$$\frac{2}{6} - \frac{4}{3} = -1$$

$$x = \frac{2}{6} \pm \frac{4}{3}$$

$$17) b^2 - 4ac \geq 0$$

$$Kx^2 - 10x + 3$$

$$(-10)^2 - 4(K)(3) \geq 0$$

$$100 - 12K \geq 0$$

$$\frac{-12K \geq -100}{-12} \quad \frac{-100}{-12}$$

$$K \leq 8.33$$

$$\textcircled{8}$$

$$19) (2-3i)(4+i)$$

$$8 + 2i - 12i - 3i^2$$

$$8 - 10i - 3(-1)$$

$$\boxed{11 - 10i}$$

$$20) 9b^2(b-1) - 4(b-1)$$

$$(b-1)(9b^2 - 4)$$

$$\boxed{(b-1)(3b+2)(3b-2)}$$

$$18) b^2 - 4ac < 0$$

$$x^2 - 6x + c = 0$$

$$(-6)^2 - 4(1)(c) < 0$$

$$36 - 4c < 0$$

$$\frac{-4c < -36}{-4} \quad \frac{-36}{-4}$$

$$c > 9$$

$$\textcircled{10}$$

$$21) 2\sqrt{8x^5} + 3x\sqrt{50x} - x^2\sqrt{98x}$$

$$2\sqrt{4x^4}\sqrt{2x} \quad 3x\sqrt{25}\sqrt{2x} \quad -x^2\sqrt{49}\sqrt{2x}$$

$$2 \cdot 2x^2\sqrt{2x} \quad 3x(5)\sqrt{2x} \quad -x^2(7)\sqrt{2x}$$

$$4x^2\sqrt{2x} + 15x\sqrt{2x} - 7x^2\sqrt{2x}$$

$$-3x^2\sqrt{2x} + 15x\sqrt{2x}$$

$$22) 2x^3 - 3 + x^2 - 6x$$

$$2x^3 + x^2 - 6x - 3$$

$$x^2(2x+1) - 3(2x+1)$$

$$(2x+1)(x^2-3)$$

$$23) \frac{y}{y-1} = \frac{2}{y} - \frac{1}{1-y} \quad \leftarrow \begin{array}{l} \text{switch order, negate top} \\ y \neq 1 \end{array}$$

$$y(y-1) \frac{y}{y-1} = \frac{2(y-1)y}{y} + \frac{1(y-1)y}{y-1}$$

$$y^2 = 2y - 2 + y$$

$$y^2 - 3y + 2 = 0$$

$$(y-2)(y-1) = 0$$

$$\textcircled{y=2} \quad y=1 \text{ reject}$$

$$24) \frac{3x^2 + x - 10}{5x - 3x^2} = \frac{3x(x+2) - 5(x+2)}{x(5-3x)} = \frac{(x+2) \cancel{3x-5}^{-1}}{x(5-3x)} = \frac{-(x+2)}{x}$$

$$= \textcircled{\frac{-x-2}{x}}$$

Additional Review Key Q2 T1

$$\text{LCD:}$$

$$\frac{2(x-8)}{x-8}$$

$$1) \frac{2x \cancel{2(x-8)}}{x-8} - \frac{5 \cancel{2(x-8)}}{2} = \frac{x+8 \cancel{2(x-8)}}{x-8}$$

$$4x - 5(x-8) = 2(x+8)$$

$$4x - 5x + 40 = 2x + 16$$

$$-x + 40 = 2x + 16$$

$$\begin{array}{r} +x - 16 \\ +x - 16 \end{array}$$

$$24 = 3x$$

$$x = 8 \text{ reject}$$

$$x = \emptyset$$

No Solution

$$2) \quad \begin{array}{r} 3b^{-1/2} + 1 = 10 \\ -1 \quad -1 \end{array}$$

$$\frac{3b^{-1/2}}{3} = \frac{9}{3}$$

$$b^{-1/2} = 3$$

$$\boxed{b = \frac{1}{9}}$$

$$3) \quad \begin{array}{r} 3x - 5\sqrt{x} = 2 \\ -3x \quad -3x \end{array}$$

$$\frac{-5\sqrt{x}}{-1} = \frac{2-3x}{-1}$$

$$(5\sqrt{x})^2 = (3x-2)^2$$

$$\begin{array}{r} 25x = 9x^2 - 12x + 4 \\ -25x \quad -25x \end{array}$$

$$0 = 9x^2 - 37x + 4$$

$$9x^2 - 36x - 1x + 4$$

$$9x(x-4) - 1(x-4)$$

$$(9x-1)(x-4)$$

$$x = \frac{1}{9} \quad \boxed{x = 4}$$

reject

4) $-x^2 + 9x - 14 < 0$
 $x^2 - 9x + 14 > 0$

Positive (open circle)

$(x-7)(x-2)$	$x-2$	-	+	+
$x=7 \quad x=2$	$x-7$	-	-	+
$(x-2)(x-7)$	$(+)$	-	$(+)$	

a) Interval: $(-\infty, 2) \cup (7, \infty)$

b) Set Builder: $\{x \mid x < 2 \text{ or } x > 7\}$

5) $x^2 - 6x \geq -8$
 $x^2 - 6x + 8 \geq 0$

Positives (closed circle)

$(x-4)(x-2)$	$(x-2)$	-	+	+
$x=4 \quad x=2$	$(x-4)$	-	-	+
$(x-2)(x-4)$	+	-	+	

a) Interval: $(-\infty, 2] \cup [4, \infty)$

b) Set Builder: $\{x \mid x \leq 2 \text{ or } x \geq 4\}$

6) $x^2 - 8x + 4 = 0$

$a=1$
 $b=-8$
 $c=4$

$$x = \frac{-(-8) \pm \sqrt{(-8)^2 - 4(1)(4)}}{2(1)} = \frac{8 \pm \sqrt{64 - 16}}{2} = \frac{8 \pm \sqrt{48}}{2}$$

$$x = \frac{8 \pm 4\sqrt{3}}{2} = \boxed{4 \pm 2\sqrt{3}}$$

OMIT

$$7) x^4 - x^2 - 12 = 0$$

$$(x^2)^2 - x^2 - 12 = 0$$

$$(x^2 - 4)(x^2 + 3) = 0$$

$$(x+2)(x-2)(x^2+3) = 0$$

$$x = -2 \quad x = 2 \quad x = \pm i\sqrt{3}$$

$$8) 16x^2 - 25 = 0$$

$$(4x+5)(4x-5) = 0$$

$$x = -\frac{5}{4} \quad x = \frac{5}{4}$$

$$10) 2x^2 - 5 = -2x$$

$$\frac{2x^2}{2} + \frac{2x}{2} - \frac{5}{2} = \frac{0}{2}$$

$$x^2 + x + \boxed{\frac{1}{4}} = \frac{5}{2} + \boxed{\frac{1}{4}}$$

$$\frac{1}{2} \quad \left(\frac{1}{2}\right)^2 = \frac{1}{4}$$

$$\left(x + \frac{1}{2}\right)^2 = \frac{11}{4}$$

$$x + \frac{1}{2} = \pm \sqrt{\frac{11}{4}}$$

$$x = -\frac{1}{2} \pm \frac{\sqrt{11}}{2}$$

$$x = -\frac{1}{2} \pm \frac{\sqrt{11}}{2}$$

$$x = \frac{-1 \pm \sqrt{11}}{2}$$

$$9) x^2 - 6x - 3 = 0$$

$$x^2 - 6x + \boxed{9} = 3 + \boxed{9}$$

$$\frac{-b}{2} = -3$$

$$\left(\frac{-6}{2}\right)^2 = 9$$

$$(x-3)^2 = 12$$

$$x-3 = \pm \sqrt{12}$$

$$x = 3 \pm \sqrt{12}$$

$$x = 3 \pm 2\sqrt{3}$$

$$11) \frac{2x^2}{2} - \frac{8x}{2} - \frac{3}{2} = \frac{0}{2}$$

$$x^2 - 4x + \boxed{4} = \frac{3}{2} + \boxed{4}$$

$$\frac{-4}{2} = -2$$

$$\left(\frac{-4}{2}\right)^2 = 4$$

$$(x-2)^2 = \frac{11}{2}$$

$$x-2 = \pm \sqrt{\frac{11}{2}}$$

$$x = 2 \pm \frac{\sqrt{11}}{\sqrt{2}}$$

$$x = 2 \pm \frac{\sqrt{22}}{2}$$

$$12) 3x^2 + x - 1 = 0$$

$$a=3 \quad b=1 \quad c=-1$$

$$x = \frac{-1 \pm \sqrt{1^2 - 4(3)(-1)}}{2(3)}$$

$$x = \frac{-1 \pm \sqrt{13}}{6}$$

$$13) 2x^2 - 4x = 8$$

$$2x^2 - 4x - 8 = 0$$

$$a=2 \quad b=-4 \quad c=-8$$

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(2)(-8)}}{2(2)}$$

$$x = \frac{4 \pm \sqrt{16 + 64}}{4}$$

$$x = \frac{4 \pm \sqrt{80}}{4}$$

→ 3.24

→ -1.24

14) 12 is positive but not a perfect square
therefore the roots are real, irrational, and unequal

(3)

$$15) b^2 - 4ac = 0$$

$$a=a \quad 4^2 - 4(a)(2) = 0$$

$$b=4 \quad 16 - 8a = 0 \quad (2)$$

$$c=2 \quad 16 = 8a$$

$$2 = a$$

$$16) Kx^2 - 5x + 2 = 0$$

$$a=K$$

$$b=-5$$

$$c=2$$

$$b^2 - 4ac \geq 0$$

$$(-5)^2 - 4(K)(2) \geq 0$$

$$25 - 8K \geq 0$$

$$\frac{25}{8} \geq \frac{8K}{8}$$

$$\frac{25}{8} \geq K$$

$$3.125 \geq K$$

$$K=3$$

$$17) 3x^2 - 6x - c = 0$$

$$a=3$$

$$b=-6$$

$$c=-c$$

$$b^2 - 4ac < 0$$

$$(-6)^2 - 4(3)(-c) < 0$$

$$36 + 12c < 0$$

$$\frac{12c}{12} < \frac{-36}{12}$$

$$c < -3$$

$$C=-4$$